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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,132	03/29/2004	Jens Peter Wittenburg	PD030014	2177
24498 7590 10/31/2007 THOMSON LICENSING LLC Two Independence Way Suite 200 PRINCETON, NJ 08540			EXAMINER LI, AIMEE J	
			ART UNIT 2183	PAPER NUMBER
			MAIL DATE 10/31/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/812,132

Applicant(s).

WITTENBURG ET AL.

Examiner

Aimee J. Li

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 1 and 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 March 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Claims 1-8 have been considered. Claims 1-8 have been amended as per Applicant's arguments.

#### *Papers Submitted*

2. It is hereby acknowledged that the following papers have been received and placed of record in the file: RCE as filed 16 August 2007 and Amendment as filed 16 August 2007.

#### *Continued Examination Under 37 CFR 1.114*

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 16 August 2007 has been entered.

#### *Claim Objections*

4. Claims 1 and 5 objected to because of the following informalities: There are numerous locations where similar verbosity and odd wording are used. The following corrections are examples from claims 1 and 5 of the verbosity and odd wording. Applicant's should review all claims and make similar, appropriate changes. In the following suggestions, changes are highlighted in bold with added language underlined and deleted language either in double brackets or with strikethrough.

- a. Claim 1: Please correction "...and wherein partial or intermediate...and wherein a scored...and wherein said scoreboard...and in said scoreboard...wherein said one or more other ones of said pipeline stages..." to read --...**[[and ]]**wherein partial

or intermediate...**[[and ]]**wherein a scored...**[[and ]]**wherein said scoreboard...**[[and ]]**in said scoreboard...**and** wherein said one or more other ones of said pipeline stages...-- .

- b. Claim 1: Please correct the language "...wherein in said scoreboard data are stored and updated about in which one or ones of said pipeline stages a currently required operand or result, or currently required operands or results, is – or are – located and available for use in one or more other ones of said pipeline stages..." to read --...wherein in said scoreboard data are stored and updated about in which one or ones of said pipeline stages a currently required one or more operand or result,~~or currently required operands or results,~~ is **[[– or are –]]** located and available for use in one or more other ones of said pipeline stages...--
- c. Claim 1: Please correct the language "...wherein said one or more of said pipeline stages makes – or make – use of said data location..." to read --...wherein said one or more of said pipeline stages**[[ makes – or]]** make **[[– ]]**use of said data location...--
- d. Claim 5: Please correct the language "...and wherein partial or intermediate...and wherein data are stored and updated..." to read --...**[[and ]]**wherein partial or intermediate...**[[and ]]**wherein data are stored and updated...--
- e. Claim 5: Please correct the language "...a scoreboard wherein data are stored and updated about in which one or ones of said pipeline stages a currently required operand or result, or currently required operands or results, is – or are – located and available for use in one or more other ones of said pipeline stages..." to read -

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...a scoreboard wherein data are stored and updated about in which one or ones of said pipeline stages a currently required one or more operand or result, ~~or currently required operands or results~~, is ~~[- or are - ]~~located and available for use in one or more other ones of said pipeline stages...--

- f. Claim 5: Please correct the language "...and wherein said one or more other ones of said pipeline stages use said data about location and said data about instruction type for accessing directly said currently required operand or result, or currently required operands or results, available in another one or in other ones of said pipeline stages, without accessing data stored in said operand/result store..." to read --...and wherein said one or more other ones of said pipeline stages use said data about location and said data about instruction type for accessing directly said currently required one or more operand or result, ~~or currently required operands or results~~, available in another one or in other ones of said pipeline stages, without accessing data stored in said operand/result store...--

5. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pomerene et al., U.S. Patent Number 4,903,196 (herein referred to as Pomerene) in view of Kerr et al., U.S. Patent Application Publication US 2003/0159021 (herein referred to as Kerr).

8. Regarding claims 1 and 5, taking claim 1 as exemplary, Pomerene has taught a method for pipeline processing a chain of processing instructions, comprising:

- a. Processing said instructions in a chain of succeeding pipeline stages, wherein partial or intermediate first pipeline processing operands or results are intermediately or permanently stored in a operand/result store for further access at the appropriate time instant or instants by one or more of said pipeline stages (Pomerene Abstract; column 1, lines 46-62; column 2, lines 12-25; column 4, lines 14-24 and 45-60; column 5, lines 49 to column 6, line 8; column 9, lines 40-63; column 7, line 1 to column 8, line 36; Figure 1; and Figure 2),
- b. And wherein partial or intermediate second pipeline processing operands or results currently available in one or more of said pipeline stages are accessed by one or more other ones of said pipeline stages at the appropriate time instant or instants without access to said operand/result store (Pomerene Abstract; column 1, lines 46-62; column 2, lines 12-25; column 4, lines 14-24 and 45-60; column 5, lines 49 to column 6, line 8; column 6, lines 40-63; column 7, line 1 to column 8, line 36; Figure 1; and Figure 2),
- c. And wherein a scoreboard is used in which information is stored about the presence or said partial or intermediate operands or results required absence of specific ones of first pipeline processing by subsequent pipeline processing

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- (Pomerene Abstract; column 1, lines 46-62; column 2, lines 12-25; column 4, lines 14-24 and 45-60; column 5, lines 49 to column 6, line 8; column 6, lines 40-63; column 7, line 1 to column 8, line 36; Figure 1; and Figure 2),
- d. And wherein in said scoreboard data are stored and updated about in which one or ones of said pipeline stages a currently required operand or result, or currently required operands or results, is - or are - located available for use in one or more other ones of said pipeline stages (Pomerene Abstract; column 1, lines 46-62; column 2, lines 12-25; column 4, lines 14-24 and 45-60; column 5, lines 49 to column 6, line 8; column 6, lines 40-63; column 7, line 1 to column 8, line 36; Figure 1; and Figure 2),
- e. And in said scoreboard, data are stored and updated about the type of instruction that is related to said currently required operand or result, or currently required operands or results (Pomerene Abstract; column 1, lines 46-62; column 2, lines 12-25; column 4, lines 14-24 and 45-60; column 5, lines 49 to column 6, line 8; column 6, lines 40-63; column 7, line 1 to column 8, line 36; Figure 1; and Figure 2),
- f. Wherein said one or more other ones of said pipeline stages makes - or make - use of said data about location and said data about instruction type for accessing directly said currently required operand or result, or currently required operands or results, without accessing data stored in said operand/result store (Pomerene Abstract; column 1, lines 46-62; column 2, lines 12-25; column 4, lines 14-24 and

45-60; column 5, lines 49 to column 6, line 8; column 6, lines 40-63; column 7, line 1 to column 8, line 36; Figure 1; and Figure 2).

9. Pomerene has not taught the currently required one or more operand or result is available in another one or in other ones of said pipeline stages. Kerr has taught the currently required one or more operand or result is available in another one or in other ones of said pipeline stages (Kerr Abstract and Paragraphs 0009-0010 and 0012-0015). A person of ordinary skill in the art at the time the invention was made, and as taught by Kerr, would have recognized that operand bypassing, not only improves processing time (Kerr Paragraph 0009), but also, in Kerr's case, improves processor performance without the need for dedicated hardware (Kerr paragraph 0015). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the bypassing of operand and result data available in other pipeline stages to improve processor performance and processing time without the need for dedicated hardware.

10. Claim 5 contains similar limitations as claim 1 and is rejected for similar reasons.

11. Regarding claims 2 and 6, taking claim 2 as exemplary, Pomerene has taught the method according to claim 1, wherein said scoreboard contains an individual incrementer for each address of a register in said operand/result store (Pomerene Abstract; column 1, lines 46-62; column 2, lines 12-25; column 4, lines 14-24 and 45-60; column 5, lines 49 to column 6, line 8; column 5, lines 40-63; column 7, line 1 to column 8, line 36; Figure 1; and Figure 2). Claim 6 contains similar limitations as claim 2 and is rejected for similar reasons.

12. Regarding claims 3 and 7, taking claim 3 as exemplary, Pomerene has taught the method according to claim 2, wherein the first one of said pipeline stages writes a zero value at the



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address of a destination register in said scoreboard upon a processing instruction entering said first pipeline stage, and all stage counters related to processing instruction that had previously entered said first pipeline stage are incremented every new cycle if the corresponding pipeline stages are not stalled, such that the current pipeline stage counting number is kept up-to-date, and wherein, upon a processed processing instruction leaving the last pipeline stage of said chain of pipeline stages, said pipeline stage counting number is set to an end value that is no more incremented (Pomerene Abstract; column 1, lines 46-62; column 2, lines 12-25; column 4, lines 14-24 and 45-60; column 5, lines 49 to column 6, line 8; column 5, lines 40-63; column 7, line 1 to column 8, line 36; Figure 1; and Figure 2). Claim 7 contains similar limitations as claim 3 and is rejected for similar reasons.

13. Regarding claims 4 and 8, taking claim 4 as exemplary, Pomerene has taught the method according to claim 1 or 2, wherein said chain of pipeline stages, except said first and the last pipeline stage, feed partial or intermediate second pipeline processing operands or results available in one or more of said pipeline stages to a common bus from which said partial or intermediate second pipeline processing operands or results can be accessed by one or more other ones of said pipeline stages at the appropriate time instant or instants without access to said operand/result store (Pomerene Abstract; column 1, lines 46-62; column 2, lines 12-25; column 4, lines 14-24 and 45-60; column 5, lines 49 to column 6, line 8; column 5, lines 40-63; column 7, line 1 to column 8, line 36; Figure 1; and Figure 2). Claim 8 contains similar limitations as claim 4 and is rejected for similar reasons.

***Response to Arguments***

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14. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Kerr et al., U.S. Patent Number 7,139,899, is the U.S. Patent of the U.S. Patent Application publication cited in the rejection above.
- b. Harriman, Jr., U.S. Patent number 5,383,960, has taught use of a scoreboard to bypass intermediate results to another pipeline stage using the intermediate results as an operand.
- c. Makineni et al., U.S. Patent Number 5,996,065, have taught bypassing intermediate results from one pipeline stage to another pipeline stage.
- d. Wong, U.S. Patent Number 6,094,711, has taught bypassing register read and write operation results in a pipeline.
- e. Rodriguez, U.S. Patent Number 6,139,199, has taught bypassing register operands between pipeline stages.
- f. Jarvis, U.S. Patent Number 7,093,107, has taught bypassing floating point results still in the pipeline to a read stage in the pipeline for other instructions.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aimee J. Li whose telephone number is (571) 272-4169. The examiner can normally be reached on M-T 7:00am-4:30pm.

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17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Aimee J Li  
Examiner  
Art Unit 2183

28 October 2007